

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : TOKUYAMA CORP

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(72)Inventor : KAWAMURA HIDETOSHI
SHIRAISHI TAIICHI

(54) STRETCH PACKAGING FILM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a stretch packaging film having suitable transparency, packaging machine aptitude, finish after packaging, heat sealability and cold resistance.

SOLUTION: A stretch packaging film has a three-layered structure consisting of a base material layer and both surface layers and the base material layer comprises a compsn. consisting of 90-20 wt.% of (a) a soft polyolefinic resin, 5-40 wt.% of (b) a crystalline polypropylene resin and 5-40 wt.% of (c) a hydrogenated deriv. of at least one kind of a resin selected from the group consisting of a petroleum resin, a terpene resin and a rosin resin and both surface layers comprise an ethylene/vinyl acetate copolymer with a content of a monomer based on vinyl acetate of 5-20 wt.% and the coefficient of crystal orientation of polypropylene in an extruding direction calculated by an X-ray diffraction method of a laminated film after film molding is 0.25 or less.

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CLAIMS

[Claim(s)]

[Claim 1] The film for stretch packaging which a laminating is carried out to both the front faces of a base material layer and this base material layer that consist of a resin constituent which blended the resinous principle of following (a) - (c) so that it might become 100 % of the weight in total, and is characterized by being the laminated film which consists of a surface layer which the content of the monomer based on vinyl acetate becomes from the ethylene-vinylacetate copolymer which is 5 - 20 % of the weight and the crystal orientation multiplier of polypropylene to the direction of extrusion for which it asked with the X-ray diffraction method being 0.25 or less.

(a) Elasticity polyolefine system resin 90 - 20 % of the weight (b) crystallinity polypropylene resin Hydrogenation derivative of at least a kind of resin chosen from the group which consists of 5 - 40-% of the weight (c) petroleum resin, terpene resin, and rosin resin It is [Claim 2] five to 40% of the weight. The film for stretch packaging according to claim 1 whose amount of crystal components which elasticity polyolefine system resin calculated by pulse method NMR is 10 - 50 % of the weight and whose tandelta peak temperature searched for by dynamic viscoelasticity measurement is -10 degrees C or less.

[Claim 3] Claim 1 whose content of the monomeric unit based on 70-90-mol % and ethylene in the content of the monomeric unit based on a propylene in elasticity polyolefine system resin is a 10-30-mol propylene [which is %]-ethylene block copolymer, and the film for stretch packaging according to claim 2.

[Claim 4] The film for stretch packaging according to claim 1 to 3 which is polypropylene resin whose elution volume component 90 degrees C or more is 60 % of the weight or more in the elution diagram to which crystalline polypropylene resin expressed with elution temperature (degree C) the axis of abscissa classified by temperature up elution separation method, and expressed the axis of ordinate with the elution weight rate.

[Claim 5] The film for stretch packaging according to claim 1 to 4 with which a base material layer contains hydrotalcites at a rate of the 0.01 - 1.0 weight section to the resin constituent 100 weight section.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the new film for stretch packaging. It is suitable as an object for stretch packaging used for prepackaging of the retail trade article which makes food a subject in detail, and is the film for stretch packaging which has the outstanding properties, such as a result after transparency, packaging-machinery fitness, and a package, heat-sealing nature, and cold resistance.

[0002]

[Description of the Prior Art] the packaging-machinery fitness for the uniform elongation property for obtaining the adhesiveness for maintaining tightly the transparency for raising commodity value as a film which generally carries and carries out stretch packaging to food, such as garden stuff, a fresh fish, prime meat, and a daily dish, direct, or a plastic tray, gloss, fog resistance, and a package, heat-sealing nature, and a tight package, flexibility, and the improvement in stretch packaging workability, and the cold resistance at the time of frozen preservation and conveyance -- and it thrusts and reinforcement etc. is needed.

[0003] As a film which fulfills such a property conventionally, the plasticized-polyvinyl-chloride film (elasticity PVC film) has been used.

[0004] On the other hand, the film for stretch packaging made from polyolefine system resin is examined as an ingredient which replaces the above-mentioned elasticity PVC film. For example, the film for stretch packaging which carried out the laminating of the ethylene-vinylacetate copolymer to both sides of the layer which uses the random copolymer of a propylene system as a principal component is proposed (JP,61-44635,A). Although the temperature width of face which can heat seal this film for stretch packaging is wide enough, there is room of amelioration about the packaging-machinery fitness of a film, and cold resistance.

[0005] Moreover, the stretch film for food packing which carried out the laminating of the ethylene system copolymer chosen as both sides of the layer of the constituent which consists of a copolymer with a kind of alpha olefin chosen from crystalline polypropylene and the alpha olefin of carbon numbers 3-12 from the ethylene vinyl acetate copolymer, the ethylene ethyl-acrylate copolymer, the ethylene-methyl-acrylate copolymer, etc. is proposed at least by JP,6-100019,A. Although transparency and the heat-sealing nature of this stretch film for food packing are comparatively good, in the result after packaging-machinery fitness and a package, the room of amelioration is still left behind.

[0006] Furthermore, the stretch film for food packing which blended petroleum resin and a hydrogenation styrene system elastomer with propylene system resin is proposed by JP,9-154479,A and the 9-165491 official report. This stretch film for food packing was that in which the room of amelioration remains about heat-sealing nature and cold resistance, although transparency, packaging-machinery fitness, and a package result were good.

[0007] Thus, although many films for polyolefine system stretch packaging are proposed, the present condition is that the film for stretch packaging excellent in transparency, packaging-machinery fitness, a package result, heat-sealing nature, and cold resistance is not yet proposed.

[0008]

[Problem(s) to be Solved by the Invention] Therefore, the purpose of this invention is to offer the film for stretch packaging excellent in a good appearance, packaging-machinery fitness, a package result, heat-sealing nature, and cold resistance.

[0009]

[Means for Solving the Problem] The result which has continued research wholeheartedly in order that this invention persons may solve the above-mentioned technical problem, Elasticity polyolefine system resin, specific crystalline polypropylene resin, and specific petroleum resin, The laminating of the surface layer which becomes both the front faces of the base material layer which consists of a hydrogenation derivative of resin, such as terpene resin and rosin resin, from a specific ethylene-vinylacetate copolymer is carried out. It finds out that all the above-mentioned technical problems can be solved from the film for stretch packaging with which the crystal orientation multiplier of the polypropylene to the direction of extrusion for which it asked with the X-ray diffraction method of this laminated film was adjusted to the specific value, and came to complete this invention.

[0010] That is, this invention is the film for stretch packaging which a laminating is carried out to both the front faces of a base material layer and this base material layer that consist of a resin constituent which blended the resinous principle of following (a) - (c) so that it might become 100 % of the weight in total, and is characterized by to be the laminated film which consists of a surface layer which the content of the monomer based on vinyl acetate becomes from the ethylene vinyl acetate copolymer which is 5 - 20 % of the weight, and for the crystal orientation multiplier of the polypropylene to the direction of extrusion for which it asked with the X-ray diffraction method to be 0.25 or less.

[0011]

(a) Elasticity polyolefine system resin 90 - 20 % of the weight (b) crystallinity polypropylene resin Hydrogenation derivative of at least a kind of resin chosen from the group which consists of 5 - 40% of the weight (c) petroleum resin, terpene resin, and rosin resin 5 - 40 % of the weight

[0012]

[Embodiment of the Invention] This invention is explained to a detail below.

[0013] As elasticity polyolefine system resin used for the base material layer of the film for stretch packaging of this invention, the random or the block copolymers, and those mixture of the random of the random of with a consistency of 0.9 or less ethylene and a with a carbon numbers of three or more alpha olefin or a block copolymer, ethylene, a propylene, and a with a carbon numbers of four or more alpha olefin or a block copolymer, a propylene, and a with a carbon numbers of four or more alpha olefin are mentioned.

[0014] As the above-mentioned elasticity polyolefine system resin Multiple-Pulse Magnetic Resonance on Some Crystalline Asked Polymers (Polymer Journal, vol3, No.4, p448-462, 1972;KFuzimoto, T.Nishi and R.Kado) by pulse method NMR of a publication. 10 - 40% of the weight of a thing is preferably used for the weight fraction of the crystal component (a) shown in a degree type suitably ten to 50% of the weight in a crystal component (a), the restrained amorphism component (b), and the amorphism component (c) which is not restrained.

[0015]

[Equation 1]

$$\text{結晶成分 (a) の重量分率} = \frac{(a)}{(a) + (b) + (c)} \times 100 (\%)$$

[0016] That is, it is [an inclination the ***** of a film and cut nature become less enough / an inclination] and is not desirable when the weight fraction of the above-mentioned crystal component (a) is less than 10 % of the weight. Moreover, it is in the inclination for the flexibility of a film to fall and for stretchable to fall and is not desirable when the weight fraction of this crystal component (a) exceeds 50 % of the weight.

[0017] Moreover, as for this elasticity polyolefine system resin, it is desirable that the tandelta peak temperature acquired by dynamic viscoelasticity measurement is -10 degrees C or less in order to improve the cold resistance of a stretch film more.

[0018] Furthermore, in the base material layer of the film for stretch packaging of this invention, the elasticity polyolefine system resin used more suitably has a desirable propylene-ethylene block copolymer from a viewpoint of compatibility with the hydrogenation derivative of resin, such as crystalline polypropylene and petroleum resin, terpene resin, and rosin resin.

[0019] the content of the monomeric unit based on a propylene in the above-mentioned propylene-ethylene block copolymer -- the content of a 70-90-mol % and the monomeric unit preferably based on 70-85-mol % and ethylene -- 10-30-mol % -- it is suitable 15-30-mol% of preferably. That is, the transparency of a film falls and is not desirable when the content of the monomeric unit based on the case below 70 mol %, i.e., ethylene, in the content of the monomeric unit based on a propylene exceeds 30-mol %. Moreover, when the content of the monomeric unit based on a propylene exceeds 90-mol % (i.e., when the content of the monomeric unit based on ethylene is less than [10 mol %]), the flexibility of a film and cold resistance fall and are not desirable.

[0020] moreover, MFR of this propylene-ethylene block copolymer -- from the film production nature of a film, and a strong viewpoint -- desirable -- 0.1-10g/-- 0.5-8g / 10min is desirable still more preferably 10 min.

[0021] A propylene-ethylene random-copolymer component has [the component rate of the polypropylene component in this propylene-ethylene block copolymer, and a propylene-ethylene random-copolymer component / a polypropylene component] 65 - 95% of the weight of a thing desirable [moreover,] five to 35% of the weight. That is, the film production nature of a film, transparency, and cold resistance become good especially by making a polypropylene component and a propylene-ethylene random-copolymer component into the above-mentioned range.

[0022] The component which consists of other little alpha olefin polymers in the range which does not spoil the effectiveness of this invention other than said polypropylene component and a propylene-ethylene random-copolymer component, for example, 2 or less % of the weight of a polybutene component etc., may contain the above-mentioned propylene-ethylene block copolymer.

[0023] the well-known approach by which the propylene-ethylene block copolymer suitably used in the base material layer of the film for stretch packaging of this invention is indicated by JP,7-53771,B -- it can manufacture. Tokuyama PER can be mentioned as a typical thing marketed.

[0024] The propylene homopolymer conventionally manufactured by the well-known approach as crystalline polypropylene resin used for the base material layer of the film for stretch packaging of this invention, a propylene-ethylene random copolymer, the random copolymer of a propylene and with a carbon numbers of four or more alpha olefin, the random copolymers of a propylene, ethylene, and with a carbon numbers of four or more alpha olefin, and those mixture are mentioned.

[0025] As the above-mentioned crystalline polypropylene resin, it is desirable especially from a viewpoint of heat-sealing nature that an elution volume component 90 degrees C or more is 60 % of the weight or more in the elution diagram which was classified by temperature up elution separation method and which expressed the axis of abscissa with elution temperature (degree C), and expressed the axis of ordinate with the elution weight rate.

[0026] In addition, temperature up elution separation method is Journal of Applied Polymer Science;Applied Polymer Symposium 45 and an approach indicated by 1-24 (1990) at the detail. First, it is the approach of carrying out elution to order from a component with the low melting point, and isolating an elution polymer component preparatively, by crystallizing a bulking agent front face sequentially from a component with the high melting point, and then raising column temperature gradually by introducing a hot polymer solution into the column filled up with the bulking agent of diatomaceous earth, and reducing column temperature gradually. It is the value measured in this invention on a solvent O-dichlorobenzene, rate-of-flow 2.5 ml/min, the programming rate of 4 degrees C / hr, and column phi30mmx300mm conditions, using SSC[by the Seng Shue science company]-7300 mold as a measuring device as shown in the example.

[0027] As a hydrogenation derivative of the petroleum resin used for the base material layer of the film for stretch packaging of this invention, terpene resin, and rosin resin, gum or the rosin resin hydrogenation derivatives from wood rosin, such as terpene resin hydrogenation derivatives

from a limonene, such as a hydrogenation derivative of a cyclopentadiene or the alicyclic petroleum resin from those dimers, or the aromatic series petroleum resin from C9 component, etc. are mentioned. These hydrogenation derivatives can be used combining a kind or two sorts or more.

[0028] The base material layer of the film for stretch packaging of this invention Elasticity polyolefine system resin 90 to 20% of the weight preferably Crystalline polypropylene resin five to 40% of the weight 85 to 30% of the weight still more preferably 85 to 25% of the weight preferably Still more preferably ten to 40% of the weight 10 - 35 % of the weight, petroleum resin, The hydrogenation derivative of at least a kind of resin chosen from the group which consists of terpene resin and rosin resin five to 40% of the weight preferably It consists of a resin constituent adjusted so that it might consist of 10 - 35 % of the weight and might become 100 % of the weight in total about the above-mentioned resinous principle still more preferably ten to 40% of the weight.

[0029] That is, in the resin constituent which constitutes a base material layer, when the loadings of elasticity polyolefine system resin exceed 90 % of the weight, packaging-machinery fitness, such as cut nature and insertion nature at the base of a tray, falls and is not desirable. Moreover, when the loadings of this elasticity polyolefine system resin are less than 20 % of the weight, the transparency of a film, flexibility, and cold resistance fall and are not desirable.

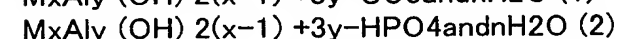
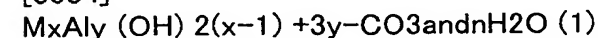
[0030] Moreover, in the resin constituent which constitutes a base material layer, when the loadings of crystalline polypropylene resin are less than 5 % of the weight, heat-sealing nature falls and is not desirable. Moreover, when the loadings of crystalline polypropylene resin exceed 40 % of the weight, the transparency of a film and a package result fall and are not desirable.

[0031] Furthermore, in the resin constituent which constitutes a base material layer, when the loadings of said hydrogenation derivative are less than 5 % of the weight, the insertion nature at the base of a tray and a package result fall and are not desirable. Moreover, when the loadings of this hydrogenation derivative exceed 40 % of the weight, cold resistance and fabrication stability fall and are not desirable.

[0032] To the above-mentioned resin constituent used for the base material layer of this invention, it is more desirable to add hydrotalcites. Generally, for a ***** rare ***** reason, a halogenide recognizes [a halogen-containing transition metal catalyst] as an impurity ultralow volume existence of the polyolefine system resin which is represented by polypropylene and polyethylene into polyolefine system resin at the catalyst system which carries out a polymerization. Therefore, saturated fatty acid salts, such as calcium stearate, are usually added as a halogen scavenger as a resin additive. However, bleed out of saturated fatty acid salts, such as calcium stearate, or the decomposition product of those is carried out, a surface appearance is spoiled or it reduces fog resistance on a film front face. Instead of saturated fatty acid salt halogen scavengers, such as calcium stearate, by adding HADOROTA Lucite showed that transparency also improved to a surprising thing, while the above-mentioned technical problem was solved.

[0033] The hydrotalcites used suitable for this invention are a kind of compounds chosen from the compound shown by the following general formula at least.

[0034]



(However, M is a divalent metal atom more than a kind, x and y are positive integers, and n is zero or more numbers.)

the divalent metal atom shown as M in the above (1) and (2) types -- the [for example, / periodic table] -- the [an IIA group metal atom and / this] -- the hydrotalcites which are chosen from an IIB metal atom and constituted by each atom of magnesium, calcium, and zinc also in these are common.

[0035] As for the loadings of the hydrotalcites added by the above-mentioned resin constituent used for the base material layer of this invention, it is desirable preferably from the point of the transparency of a halogen prehension function and a film the 0.01 - 1.0 weight section and that it is the 0.02 - 0.5 weight section to the above-mentioned resin constituent 100 weight section

used for a base material layer.

[0036] Although the hydrotalcites used suitable for this invention may use what kind of addition approach, it is more effective from a viewpoint of dispersibility to add beforehand in the elasticity polyolefine system resin used as a base material layer and crystalline polypropylene resin.

[0037] Moreover, to the resin constituent of the above-mentioned base material layer of this invention, ***** tone matter, such as an addition component, for example, polybutene, and paraffin, an antioxidant, an antistatic agent, lubricant, an antifogger, a binder, light stabilizer, a gas adsorption agent, a coloring agent, perfume, an antimicrobial agent, etc. can be added if needed.

[0038] The content of the monomer based on vinyl acetate in the ethylene-vinylacetate copolymer used as resin of the surface layer of this invention is 7 - 18 % of the weight preferably five to 20% of the weight. This content falls [heat-sealing nature] and is not desirable less than 5% of the weight of a case. Moreover, when this content exceeds 20 % of the weight, the cut nature of a film and the adhesiveness of a film are too strong, and the conveyance nature of a film and base insertion nature fall and are not desirable.

[0039] In the surface layer which consists of ethylene-vinylacetate copolymer resin, it can add [for the purpose of ***** tone matter, such as polybutene and paraffin an antioxidant, an antistatic agent, lubricant, an antifogger, a binder, light stabilizer, a gas adsorption agent, a coloring agent, perfume, an antimicrobial agent, etc.].

[0040] The crystal orientation multiplier of the polypropylene to the direction of extrusion of the film which asked for the film for stretch packaging of this invention with the X-ray diffraction method is 0.20 or less preferably 0.25 or less. That is, when extent of the crystal orientation of the polypropylene to the direction of extrusion of a film becomes large too much when this crystal orientation multiplier exceeds 0.25, and stretch packaging is carried out to the fall and the direction of extrusion, and the perpendicular direction of cut nature of a film, a film front face milks and is not desirable.

[0041] In order that the manufacture approach of the film for stretch packaging of this invention may control the crystal orientation multiplier of the polypropylene shown in this invention in the above-mentioned range, the shaping approach by the upward air-cooling tubular film process is adopted suitably. In a upward tubular film process, especially in order to control the crystal orientation multiplier shown in this invention in the above-mentioned range, it is desirable to make it conditions as show resin temperature, coolant gas temperature, and a blow ratio below. That is, 180-220 degrees C of resin temperature are desirable still more desirable, 180-210 degrees C and coolant gas temperature have desirable still more desirable 0-30 degrees C, 3-20 are desirable still more desirable, and 3-30 degrees C and a blow ratio are 5-15.

[0042] With the whole film, the thickness of the film for stretch packaging of this invention is 5-30 micrometers, and is usually 7-20 micrometers preferably. When thinner than the above-mentioned thickness, it not only becomes difficult to fabricate an accurate film, but it is in the inclination for film reinforcement to fall. When thicker than the above-mentioned thickness, there is an inclination which not only disadvantage but a tight package stops it in cost to be able to carry out easily. Furthermore, the thickness of each surface layer has the desirable range which becomes 10 - 100% to the thickness of a base material layer from a viewpoint of heat-sealing nature.

[0043]

[Effect of the Invention] The film for stretch packaging of this invention is excellent in transparency, packaging-machinery fitness, a package result, heat-sealing nature, and cold resistance.

[0044]

[Example] Although an example and the example of a comparison are shown in order to explain this invention concretely below, this invention is not limited to these examples at all. Moreover, in a following example and the following example of a comparison, various measured value was carried out by the following approaches.

[0045] 1. The peak was belonged by the approach indicated by the measurement Polymer 29 of the ethylene content by measuring method (1) ¹³C-NMR, and 1848 (1988), and the ethylene content was measured by the approach indicated by Macromoleculus 10,773 (1977).

[0046] (2) X-ray diffractometer JDX-3500 by measurement JEOL of the crystal orientation multiplier of polypropylene were equipped with fiber sample equipment, and it measured the following condition.

[0047]

A target : The copper tube electric current and an electrical potential difference : A 40kv-400mAX line incidence method : Straight beam transmission method 12theta scan (Bragg angle) measurement measurement angle range (2theta) : [8-32 degree travel] : 0.1-degree gate time : 2-second side [2] internal-version (beta rotation) measurement measurement angle range (beta) :-20-110-degree travel : 0.5-degree gate time : Cut down a film in 15mmx width of face of 5mm for 2 seconds at the direction of extrusion, equip fiber sample equipment with 100 strip-of-paper-like samples in piles, and receive a film plane first. Incidence of the X-ray was carried out perpendicularly, 2theta scan was performed with the perpendicular transmission method, and the Bragg angle of the field (110) of a polypropylene crystal and (040) a field was determined. Next, the counter was fixed to the Bragg angle of a field (110), the field internal version of the sample was carried out, and intensity-distribution measurement was performed about the field (110). Intensity-distribution measurement of a field (040) was performed similarly. After asking for the background reinforcement by air dispersion etc., it deducted from the diffraction intensity distribution of a field and (040) a field, respectively (110), and it asked for the crystal orientation multiplier of polypropylene, after acquiring the orientation distribution curve of a field (110) and (040) a field.

[0048] (3) The measurement pulse sequence was measured by 200 counts of addition in 20MHz of test frequencies using measurement Japan Bruker PC-120 equipment of the amount of crystal components by pulse method NMR for the measurement temperature of 30 degrees C, and pulse repetition-time 5 seconds, using the solid *****ing method as 1H. the obtained magnetization decay curve -- a logarithm -- it plotted, segregation was performed to reference KFujimoto, T.Nishi and R.Kado, Polymer.J., and Vo 1.3,448-462 (1972) by the approach of a publication, and it asked for each component.

[0049] (4) It measured using the viscoelasticity measuring device DMS 200 by dynamic viscoelasticity measurement SEIKO electronic industry incorporated company by 10Hz of test frequencies, and the programming rate of 2 degrees C / min.

[0050] (5) It carried out in the following Measuring conditions using temperature up elution separation method Seng Shue science company make and SSC-7300 mold.

[0051]

Solvent The;O-dichlorobenzene rate of flow ; A 2.5 ml/min programming rate ; 4 degrees C / hr sample concentration ; 0.7wt% sample injection rate ; 100ml detector ; An infrared detector, wavelength the column of 3.41 micrometers ; A phi30mmx300mm bulking agent ; Chromosorb P 30 - 60mesh column cooling rate ; It applies to the measurement JIS K7210 of 2.0 degrees C/hr (6) MFR correspondingly. Propylene resin 190 degrees C and 2.16kg load performed the ethylene system polymer by 230 degrees C and the 2.16K g load. (7) It measured according to measurement JIS K7105 of Hayes.

[0052] (8) In fabrication nature multilayer facing-up air-cooling inflation molding of a film, two steps of stability of the bubble in 60 m/min were evaluated for the film production rate.

[0053] O : bubble stability is good.

[0054] x: Change rolling of a bubble, and the diameter of a bubble.

[0055] (9) Product made from packaging-machinery fitness Teraoka elaborate -- using stretch automatic packer AW-3600, 200g clay was carried on C-33 (size: 280mmx210mmx28mm) and a FS-D5 (size: 298mmx155mmx22mm) firing polystyrene tray, 30 pack continuation package was carried out with the film with a width of face of 350mm, and automatic conditions estimated each item.

[0056] ** Within the cut nature automatic packer, it evaluated [two-step] whether a film could cut with the Giza cutting edge.

[0057] O : it can cut satisfactory.

[0058] x: A cut end is not smooth although the cut is possible.

[0059] ** Within the film transport nature automatic packer, it evaluated [two-step] whether a

film would convey smoothly.

[0060] O : convey smoothly satisfactory and the omission of the film from a belt is also good.

[0061] x: The omission of the film from a belt is bad and a package trouble occurs.

[0062] ** When the foaming tray of the base insertion nature C-33 was packed, three-stage evaluation of the lap condition of the film in a tray bottom surface part was carried out.

[0063]

O : -- the lap condition of a film -- more than 20mm** : -- the lap condition of a film -- 3-20mmx : -- the lap of less than 3mm and a film does not have the lap condition of a film.

[0064] ** It evaluated two steps of formation-of-wrinkles extent at the time of packing the foaming tray of result FS-D5.

[0065] O : it is [no formation of wrinkles] and is good.

[0066] x: A wrinkle occurs.

[0067] ** When the foaming tray of surface milkiness extent C-33 was packed, two steps of milkiness extent on the front face of a film were evaluated.

[0068] O : it is [no surface milkiness] and is good.

[0069] x: A film front face milks.

[0070] (10) The evaluation film of heat-sealing nature was sampled to 1cmx5cm, and in piles, in the Yasuda Energy machine factory JIS heat sealer, the seal was carried out in the pressure of 0.5kg/cm², and 1 second at predetermined temperature, and the temperature (TS) and the film which films weld searched for the temperature (TP) to which ***** opens, and considered two TP-TS as evaluation of heat-sealing nature.

[0071] (11) With the cold-resistant evaluation dirt impact circuit tester, it measured under the 0-degree C condition.

[0072] 2. Use Resin and Elasticity Polyolefine System Resin : PER T310V Tokuyama Make (Content % and MFR of Monomer Based on Amount [of 22.0 % of the Weight] of Crystal Components, TanDelta Peak Temperature [of -19 Degrees C], and Ethylene1.5G/10Min, and Hydrotalcite DHT-4A Product made from Consonance Chemical Industry, 0.2 % of the Weight of Additions) [of 22 Mols]

- Crystalline polypropylene resin : FA520 Tokuyama Make (74 % of the weight of elution volume components 90 degrees C or more and hydrotalcite DHT-4A for which it asked by MFR2.0g/10min, and temperature up temperature elution separation method the product made from the consonance chemical industry, 0.2 % of the weight of additions)

As shown in example 1 table 1, 98 % of the weight (16 % of the weight of contents of the monomer based on Eve FREX V5714:MFR2.0g/10min, and vinyl acetate) of ethylene-vinylacetate copolymers and the constituent of 2 % of the weight of diglycerol mono-olate were used as resin of a surface layer as resin of a base material layer using the constituent which consists of 10 % of the weight (chestnut ARON P125: Yasuhara Chemical make) of hydrogenation terpene resin PER T310V 80 % of the weight and FA520 10% of the weight. these resin -- a multilayer facing-up tubular blown film making machine -- using -- the extruder of the base material layer resin constituent from the extruder of the 2nd layer, the 1st layer, and the 3rd layer to an ethylene vinyl acetate copolymer constituent -- layer [1st] : 2nd layer: -- the 3rd -- it extruded to the annular dice by the discharge quantity of layer =1:3:1, and the laminating was carried out within the annular dice at 200 degrees C, and it extruded in the shape of a film. Subsequently, Ayr was blown into the interior of a melting cylindrical film, from the exterior, 5-degree C Ayr was sprayed on annular, air-cooling solidification was carried out and the film with a thickness of 13 micrometers was obtained by the blow ratio 7.0. The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0073] As shown in one to examples 2-4 and example of comparison 3 table 1, it carried out like the example 1 except having changed combination of a base material layer resin constituent. The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0074] In example of comparison 4 example 1, it carried out like the example 1 as resin of a surface layer except having considered as the ethylene-vinylacetate copolymer (25 % of the weight of contents of the monomer based on Eve FREX V5701:MFR2.0g/10min, and vinyl

acetate). The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0075] In example of comparison 5 example 1, it carried out like the example 1 except having considered as the resin temperature of 175 degrees C, the coolant gas temperature of 35 degrees C, and the blow ratio 1.5. The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0076]

[Table 1]

表1

	基材層樹脂				表面層樹脂	ポリプロピレンの 結晶配向係数
	軟質ポリオレフ イン系樹脂	結晶性ポリプ ロピレン樹脂	石油、テルペン、 ロジン樹脂の水 素添加誘導体	ハイドロタルサ イト系添加剤	エチレン-酢酸 ビニル共重合体	
	PER T310V	FA520	クリアロンP125	DHT-4A		
実施例1	80	10	10	0.18	V5714	0.09
実施例2	60	20	20	0.16	V5714	0.11
実施例3	50	20	30	0.14	V5714	0.13
実施例4	40	30	30	0.14	V5714	0.15
比較例1	100	0	0	0.20	V5714	0.09
比較例2	40	50	10	0.18	V5714	0.19
比較例3	30	20	50	0.10	V5714	0.07
比較例4	80	10	10	0.09	V5701	0.09
比較例5	80	10	10	0.18	V5714	0.30

[0077]

[Table 2]

表2

	ヘイズ (%)	成形 加工性	包装機械適性			仕上がり		ヒートシール性 (°C)	耐寒性 (kg·cm)
			カット性	搬送性	底面折り 込み性	量	表面 白化		
実施例1	1.2	○	○	○	○	○	○	45	7.5
実施例2	1.1	○	○	○	○	○	○	45	6.3
実施例3	1.3	○	○	○	○	○	○	45	5.8
実施例4	1.3	○	○	○	○	○	○	50	5.5
比較例1	1.4	○	×	○	×	×	○	30	8.2
比較例2	3.8	○	○	○	○	×	○	50	5.0
比較例3	1.2	×	○	○	○	○	○	40	1.5
比較例4	1.6	○	×	×	△	○	○	45	8.0
比較例5	1.4	○	×	○	○	○	×	45	8.1

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the new film for stretch packaging. It is suitable as an object for stretch packaging used for prepackaging of the retail trade article which makes food a subject in detail, and is the film for stretch packaging which has the outstanding properties, such as a result after transparency, packaging-machinery fitness, and a package, heat-sealing nature, and cold resistance.

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PRIOR ART

[Description of the Prior Art] the packaging-machinery fitness for the uniform elongation property for obtaining the adhesiveness for maintaining tightly the transparency for raising commodity value as a film which generally carries and carries out stretch packaging to food, such as garden stuff, a fresh fish, prime meat, and a daily dish, direct, or a plastic tray, gloss, fog resistance, and a package, heat-sealing nature, and a tight package, flexibility, and the improvement in stretch packaging workability, and the cold resistance at the time of frozen preservation and conveyance -- and it thrusts and reinforcement etc. is needed.

[0003] As a film which fulfills such a property conventionally, the plasticized-polyvinyl-chloride film (elasticity PVC film) has been used.

[0004] On the other hand, the film for stretch packaging made from polyolefine system resin is examined as an ingredient which replaces the above-mentioned elasticity PVC film. For example, the film for stretch packaging which carried out the laminating of the ethylene-vinylacetate copolymer to both sides of the layer which uses the random copolymer of a propylene system as a principal component is proposed (JP,61-44635,A). Although the temperature width of face which can heat seal this film for stretch packaging is wide enough, there is room of amelioration about the packaging-machinery fitness of a film, and cold resistance.

[0005] Moreover, the stretch film for food packing which carried out the laminating of the ethylene system copolymer chosen as both sides of the layer of the constituent which consists of a copolymer with a kind of alpha olefin chosen from crystalline polypropylene and the alpha olefin of carbon numbers 3-12 from the ethylene vinyl acetate copolymer, the ethylene ethyl-acrylate copolymer, the ethylene-methyl-acrylate copolymer, etc. is proposed at least by JP,6-100019,A. Although transparency and the heat-sealing nature of this stretch film for food packing are comparatively good, in the result after packaging-machinery fitness and a package, the room of amelioration is still left behind.

[0006] Furthermore, the stretch film for food packing which blended petroleum resin and a hydrogenation styrene system elastomer with propylene system resin is proposed by JP,9-154479,A and the 9-165491 official report. This stretch film for food packing was that in which the room of amelioration remains about heat-sealing nature and cold resistance, although transparency, packaging-machinery fitness, and a package result were good.

[0007] Thus, although many films for polyolefine system stretch packaging are proposed, the present condition is that the film for stretch packaging excellent in transparency, packaging-machinery fitness, a package result, heat-sealing nature, and cold resistance is not yet proposed.

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EFFECT OF THE INVENTION

[Effect of the Invention] The film for stretch packaging of this invention is excellent in transparency, packaging-machinery fitness, a package result, heat-sealing nature, and cold resistance.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Therefore, the purpose of this invention is to offer the film for stretch packaging excellent in a good appearance, packaging-machinery fitness, a package result, heat-sealing nature, and cold resistance.

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MEANS

[Means for Solving the Problem] The result which has continued research wholeheartedly in order that this invention persons may solve the above-mentioned technical problem, Elasticity polyolefine system resin, specific crystalline polypropylene resin, and specific petroleum resin, The laminating of the surface layer which becomes both the front faces of the base material layer which consists of a hydrogenation derivative of resin, such as terpene resin and rosin resin, from a specific ethylene-vinylacetate copolymer is carried out. It finds out that all the above-mentioned technical problems can be solved from the film for stretch packaging with which the crystal orientation multiplier of the polypropylene to the direction of extrusion for which it asked with the X-ray diffraction method of this laminated film was adjusted to the specific value, and came to complete this invention.

[0010] That is, this invention is the film for stretch packaging which a laminating is carried out to both the front faces of a base material layer and this base material layer that consist of a resin constituent which blended the resinous principle of following (a) - (c) so that it might become 100 % of the weight in total, and is characterized by to be the laminated film which consists of a surface layer which the content of the monomer based on vinyl acetate becomes from the ethylene vinyl acetate copolymer which is 5 - 20 % of the weight, and for the crystal orientation multiplier of the polypropylene to the direction of extrusion for which it asked with the X-ray diffraction method to be 0.25 or less.

[0011]

(a) Elasticity polyolefine system resin 90 - 20 % of the weight (b) crystallinity polypropylene resin Hydrogenation derivative of at least a kind of resin chosen from the group which consists of 5 - 40-% of the weight (c) petroleum resin, terpene resin, and rosin resin 5 - 40 % of the weight

[0012]

[Embodiment of the Invention] This invention is explained to a detail below.

[0013] As elasticity polyolefine system resin used for the base material layer of the film for stretch packaging of this invention, the random or the block copolymers, and those mixture of the random of the random of with a consistency of 0.9 or less ethylene and a with a carbon numbers of three or more alpha olefin or a block copolymer, ethylene, a propylene, and a with a carbon numbers of four or more alpha olefin or a block copolymer, a propylene, and a with a carbon numbers of four or more alpha olefin are mentioned.

[0014] As the above-mentioned elasticity polyolefine system resin Multiple-Pulse Magnetic Resonance on Some Crystalline Asked Polymers (Polymer Journal, vol3, No.4, p448-462, 1972;KFuzimoto, T.Nishi and R.Kado) by pulse method NMR of a publication. 10 - 40% of the weight of a thing is preferably used for the weight fraction of the crystal component (a) shown in a degree type suitably ten to 50% of the weight in a crystal component (a), the restrained amorphism component (b), and the amorphism component (c) which is not restrained.

[0015]

[Equation 1]

$$\text{結晶成分 (a) の重量分率} = \frac{(a)}{(a) + (b) + (c)} \times 100 (\%)$$

[0016] That is, it is [an inclination the ***** of a film and cut nature become less enough / an inclination] and is not desirable when the weight fraction of the above-mentioned crystal component (a) is less than 10 % of the weight. Moreover, it is in the inclination for the flexibility of a film to fall and for stretchable to fall and is not desirable when the weight fraction of this crystal component (a) exceeds 50 % of the weight.

[0017] Moreover, as for this elasticity polyolefine system resin, it is desirable that the tandelta peak temperature acquired by dynamic viscoelasticity measurement is -10 degrees C or less in order to improve the cold resistance of a stretch film more.

[0018] Furthermore, in the base material layer of the film for stretch packaging of this invention, the elasticity polyolefine system resin used more suitably has a desirable propylene-ethylene block copolymer from a viewpoint of compatibility with the hydrogenation derivative of resin, such as crystalline polypropylene and petroleum resin, terpene resin, and rosin resin.

[0019] the content of the monomeric unit based on a propylene in the above-mentioned propylene-ethylene block copolymer -- the content of a 70-90-mol % and the monomeric unit preferably based on 70-85-mol % and ethylene -- 10-30-mol % -- it is suitable 15-30-mol% of preferably. That is, the transparency of a film falls and is not desirable when the content of the monomeric unit based on the case below 70 mol %, i.e., ethylene, in the content of the monomeric unit based on a propylene exceeds 30-mol %. Moreover, when the content of the monomeric unit based on a propylene exceeds 90-mol % (i.e., when the content of the monomeric unit based on ethylene is less than [10 mol %]), the flexibility of a film and cold resistance fall and are not desirable.

[0020] moreover, MFR of this propylene-ethylene block copolymer -- from the film production nature of a film, and a strong viewpoint -- desirable -- 0.1-10g/-- 0.5-8g / 10min is desirable still more preferably 10 min.

[0021] A propylene-ethylene random-copolymer component has [the component rate of the polypropylene component in this propylene-ethylene block copolymer, and a propylene-ethylene random-copolymer component / a polypropylene component] 65 - 95% of the weight of a thing desirable [moreover,] five to 35% of the weight. That is, the film production nature of a film, transparency, and cold resistance become good especially by making a polypropylene component and a propylene-ethylene random-copolymer component into the above-mentioned range.

[0022] The component which consists of other little alpha olefin polymers in the range which does not spoil the effectiveness of this invention other than said polypropylene component and a propylene-ethylene random-copolymer component, for example, 2 or less % of the weight of a polybutene component etc., may contain the above-mentioned propylene-ethylene block copolymer.

[0023] the well-known approach by which the propylene-ethylene block copolymer suitably used in the base material layer of the film for stretch packaging of this invention is indicated by JP,7-53771,B -- it can manufacture. Tokuyama PER can be mentioned as a typical thing marketed.

[0024] The propylene homopolymer conventionally manufactured by the well-known approach as crystalline polypropylene resin used for the base material layer of the film for stretch packaging of this invention, a propylene-ethylene random copolymer, the random copolymer of a propylene and with a carbon numbers of four or more alpha olefin, the random copolymers of a propylene, ethylene, and with a carbon numbers of four or more alpha olefin, and those mixture are mentioned.

[0025] As the above-mentioned crystalline polypropylene resin, it is desirable especially from a viewpoint of heat-sealing nature that an elution volume component 90 degrees C or more is 60 % of the weight or more in the elution diagram which was classified by temperature up elution separation method and which expressed the axis of abscissa with elution temperature (degree C), and expressed the axis of ordinate with the elution weight rate.

[0026] In addition, temperature up elution separation method is Journal of Applied Polymer Science;Applied Polymer Symposium 45 and an approach indicated by 1-24 (1990) at the detail. First, it is the approach of carrying out elution to order from a component with the low melting point, and isolating an elution polymer component preparatively, by crystallizing a bulking agent front face sequentially from a component with the high melting point, and then raising column

temperature gradually by introducing a hot polymer solution into the column filled up with the bulking agent of diatomaceous earth, and reducing column temperature gradually. It is the value measured in this invention on a solvent O-dichlorobenzene, rate-of-flow 2.5 ml/min, the programming rate of 4 degrees C / hr, and column $\phi 30\text{mm} \times 300\text{mm}$ conditions, using SSC[by the Seng Shue science company]-7300 mold as a measuring device as shown in the example.

[0027] As a hydrogenation derivative of the petroleum resin used for the base material layer of the film for stretch packaging of this invention, terpene resin, and rosin resin, gum or the rosin resin hydrogenation derivatives from wood rosin, such as terpene resin hydrogenation derivatives from a limonene, such as a hydrogenation derivative of a cyclopentadiene or the alicyclic petroleum resin from those dimers, or the aromatic series petroleum resin from C9 component, etc. are mentioned. These hydrogenation derivatives can be used combining a kind or two sorts or more.

[0028] The base material layer of the film for stretch packaging of this invention Elasticity polyolefine system resin 90 to 20% of the weight preferably Crystalline polypropylene resin five to 40% of the weight 85 to 30% of the weight still more preferably 85 to 25% of the weight preferably Still more preferably ten to 40% of the weight 10 - 35 % of the weight, petroleum resin, The hydrogenation derivative of at least a kind of resin chosen from the group which consists of terpene resin and rosin resin five to 40% of the weight preferably It consists of a resin constituent adjusted so that it might consist of 10 - 35 % of the weight and might become 100 % of the weight in total about the above-mentioned resinous principle still more preferably ten to 40% of the weight.

[0029] That is, in the resin constituent which constitutes a base material layer, when the loadings of elasticity polyolefine system resin exceed 90 % of the weight, packaging-machinery fitness, such as cut nature and insertion nature at the base of a tray, falls and is not desirable. Moreover, when the loadings of this elasticity polyolefine system resin are less than 20 % of the weight, the transparency of a film, flexibility, and cold resistance fall and are not desirable.

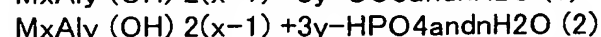
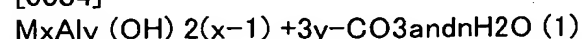
[0030] Moreover, in the resin constituent which constitutes a base material layer, when the loadings of crystalline polypropylene resin are less than 5 % of the weight, heat-sealing nature falls and is not desirable. Moreover, when the loadings of crystalline polypropylene resin exceed 40 % of the weight, the transparency of a film and a package result fall and are not desirable.

[0031] Furthermore, in the resin constituent which constitutes a base material layer, when the loadings of said hydrogenation derivative are less than 5 % of the weight, the insertion nature at the base of a tray and a package result fall and are not desirable. Moreover, when the loadings of this hydrogenation derivative exceed 40 % of the weight, cold resistance and fabrication stability fall and are not desirable.

[0032] To the above-mentioned resin constituent used for the base material layer of this invention, it is more desirable to add hydrotalcites. Generally, for a ***** rare ***** reason, a halogenide recognizes [a halogen-containing transition metal catalyst] as an impurity ultralow volume existence of the polyolefine system resin which is represented by polypropylene and polyethylene into polyolefine system resin at the catalyst system which carries out a polymerization. Therefore, saturated fatty acid salts, such as calcium stearate, are usually added as a halogen scavenger as a resin additive. However, bleed out of saturated fatty acid salts, such as calcium stearate, or the decomposition product of those is carried out, a surface appearance is spoiled or it reduces fog resistance on a film front face. Instead of saturated fatty acid salt halogen scavengers, such as calcium stearate, by adding HADOROTA Lucite showed that transparency also improved to a surprising thing, while the above-mentioned technical problem was solved.

[0033] The hydrotalcites used suitable for this invention are a kind of compounds chosen from the compound shown by the following general formula at least.

[0034]



(However, M is a divalent metal atom more than a kind, x and y are positive integers, and n is zero or more numbers.)

the divalent metal atom shown as M in the above (1) and (2) types -- the [for example, / periodic table] -- the [an IIA group metal atom and / this] -- the hydrotalcites which are chosen from an IIB metal atom and constituted by each atom of magnesium, calcium, and zinc also in these are common.

[0035] As for the loadings of the hydrotalcites added by the above-mentioned resin constituent used for the base material layer of this invention, it is desirable preferably from the point of the transparency of a halogen prehension function and a film the 0.01 - 1.0 weight section and that it is the 0.02 - 0.5 weight section to the above-mentioned resin constituent 100 weight section used for a base material layer.

[0036] Although the hydrotalcites used suitable for this invention may use what kind of addition approach, it is more effective from a viewpoint of dispersibility to add beforehand in the elasticity polyolefine system resin used as a base material layer and crystalline polypropylene resin.

[0037] Moreover, to the resin constituent of the above-mentioned base material layer of this invention, ***** tone matter, such as an addition component, for example, polybutene, and paraffin, an antioxidant, an antistatic agent, lubricant, an antifogger, a binder, light stabilizer, a gas adsorption agent, a coloring agent, perfume, an antimicrobial agent, etc. can be added if needed.

[0038] The content of the monomer based on vinyl acetate in the ethylene-vinylacetate copolymer used as resin of the surface layer of this invention is 7 - 18 % of the weight preferably five to 20% of the weight. This content falls [heat-sealing nature] and is not desirable less than 5% of the weight of a case. Moreover, when this content exceeds 20 % of the weight, the cut nature of a film and the adhesiveness of a film are too strong, and the conveyance nature of a film and base insertion nature fall and are not desirable.

[0039] In the surface layer which consists of ethylene-vinylacetate copolymer resin, it can add [for the purpose of ***** tone matter, such as polybutene and paraffin an antioxidant, an antistatic agent, lubricant, an antifogger, a binder, light stabilizer, a gas adsorption agent, a coloring agent, perfume, an antimicrobial agent, etc.].

[0040] The crystal orientation multiplier of the polypropylene to the direction of extrusion of the film which asked for the film for stretch packaging of this invention with the X-ray diffraction method is 0.20 or less preferably 0.25 or less. That is, when extent of the crystal orientation of the polypropylene to the direction of extrusion of a film becomes large too much when this crystal orientation multiplier exceeds 0.25, and stretch packaging is carried out to the fall and the direction of extrusion, and the perpendicular direction of cut nature of a film, a film front face milks and is not desirable.

[0041] In order that the manufacture approach of the film for stretch packaging of this invention may control the crystal orientation multiplier of the polypropylene shown in this invention in the above-mentioned range, the shaping approach by the upward air-cooling tubular film process is adopted suitably. In a upward tubular film process, especially in order to control the crystal orientation multiplier shown in this invention in the above-mentioned range, it is desirable to make it conditions as show resin temperature, coolant gas temperature, and a blow ratio below. That is, 180-220 degrees C of resin temperature are desirable still more desirable, 180-210 degrees C and coolant gas temperature have desirable still more desirable 0-30 degrees C, 3-20 are desirable still more desirable, and 3-30 degrees C and a blow ratio are 5-15.

[0042] With the whole film, the thickness of the film for stretch packaging of this invention is 5-30 micrometers, and is usually 7-20 micrometers preferably. When thinner than the above-mentioned thickness, it not only becomes difficult to fabricate an accurate film, but it is in the inclination for film reinforcement to fall. When thicker than the above-mentioned thickness, there is an inclination which not only disadvantage but a tight package stops it in cost to be able to carry out easily. Furthermore, the thickness of each surface layer has the desirable range which becomes 10 - 100% to the thickness of a base material layer from a viewpoint of heat-sealing nature.

[0043]

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EXAMPLE

[Example] Although an example and the example of a comparison are shown in order to explain this invention concretely below, this invention is not limited to these examples at all. Moreover, in a following example and the following example of a comparison, various measured value was carried out by the following approaches.

[0045] 1. The peak was belonged by the approach indicated by the measurement Polymer 29 of the ethylene content by measuring method (1) ¹³C-NMR, and 1848 (1988), and the ethylene content was measured by the approach indicated by Macromoleculs 10,773 (1977).

[0046] (2) X-ray diffractometer JDX-3500 by measurement JEOL of the crystal orientation multiplier of polypropylene were equipped with fiber sample equipment, and it measured the following condition.

[0047]

A target : The copper tube electric current and an electrical potential difference : A 40kv-400mA X line incidence method : Straight beam transmission method 2 θ scan (Bragg angle) measurement measurement angle range (2 θ) : [8-32 degree travel] : 0.1-degree gate time : 2-second side [2] internal-version (beta rotation) measurement measurement angle range (beta) : -20-110-degree travel : 0.5-degree gate time : Cut down a film in 15mmx width of face of 5mm for 2 seconds at the direction of extrusion, equip fiber sample equipment with 100 strip-of-paper-like samples in piles, and receive a film plane first. Incidence of the X-ray was carried out perpendicularly, 2 θ scan was performed with the perpendicular transmission method, and the Bragg angle of the field (110) of a polypropylene crystal and (040) a field was determined. Next, the counter was fixed to the Bragg angle of a field (110), the field internal version of the sample was carried out, and intensity-distribution measurement was performed about the field (110). Intensity-distribution measurement of a field (040) was performed similarly. After asking for the background reinforcement by air dispersion etc., it deducted from the diffraction intensity distribution of a field and (040) a field, respectively (110), and it asked for the crystal orientation multiplier of polypropylene, after acquiring the orientation distribution curve of a field (110) and (040) a field.

[0048] (3) The measurement pulse sequence was measured by 200 counts of addition in 20MHz of test frequencies using measurement Japan Bruker PC-120 equipment of the amount of crystal components by pulse method NMR for the measurement temperature of 30 degrees C, and pulse repetition-time 5 seconds, using the solid *****ing method as ¹H. the obtained magnetization decay curve -- a logarithm -- it plotted, segregation was performed to reference KFujimoto, T.Nishi and R.Kado, Polymer.J., and Vo 1,3,448-462 (1972) by the approach of a publication, and it asked for each component.

[0049] (4) It measured using the viscoelasticity measuring device DMS 200 by dynamic viscoelasticity measurement SEIKO electronic industry incorporated company by 10Hz of test frequencies, and the programming rate of 2 degrees C / min.

[0050] (5) It carried out in the following Measuring conditions using temperature up elution separation method Seng Shue science company make and SSC-7300 mold.

[0051]

Solvent The;O-dichlorobenzene rate of flow ; A 2.5 ml/min programming rate ; 4 degrees C / hr

sample concentration ; 0.7wt% sample injection rate ; 100ml detector ; An infrared detector, wavelength the column of 3.41 micrometers ; A phi30mmx300mm bulking agent ; Chromosorb P 30 - 60mesh column cooling rate ; It applies to the measurement JIS K7210 of 2.0 degrees C/hr (6) MFR correspondingly. Propylene resin 190 degrees C and 2.16kg load performed the ethylene system polymer by 230 degrees C and the 2.16K g load. (7) It measured according to measurement JIS K7105 of Hayes.

[0052] (8) In fabrication nature multilayer facing-up air-cooling inflation molding of a film, two steps of stability of the bubble in 60 m/min were evaluated for the film production rate.

[0053] O : bubble stability is good.

[0054] x: Change rolling of a bubble, and the diameter of a bubble.

[0055] (9) Product made from packaging-machinery fitness Teraoka elaborate -- using stretch automatic packer AW-3600, 200g clay was carried on C-33 (size: 280mmx210mmx28mm) and a FS-D5 (size: 298mmx155mmx22mm) firing polystyrene tray, 30 pack continuation package was carried out with the film with a width of face of 350mm, and automatic conditions estimated each item.

[0056] ** Within the cut nature automatic packer, it evaluated [two-step] whether a film could cut with the Giza cutting edge.

[0057] O : it can cut satisfactory.

[0058] x: A cut end is not smooth although the cut is possible.

[0059] ** Within the film transport nature automatic packer, it evaluated [two-step] whether a film would convey smoothly.

[0060] O : convey smoothly satisfactory and the omission of the film from a belt is also good.

[0061] x: The omission of the film from a belt is bad and a package trouble occurs.

[0062] ** When the foaming tray of the base insertion nature C-33 was packed, three-stage evaluation of the lap condition of the film in a tray bottom surface part was carried out.

[0063]

O : -- the lap condition of a film -- more than 20mm** : -- the lap condition of a film -- 3-20mmx: -- the lap of less than 3mm and a film does not have the lap condition of a film.

[0064] ** It evaluated two steps of formation-of-wrinkles extent at the time of packing the foaming tray of result FS-D5.

[0065] O : it is [no formation of wrinkles] and is good.

[0066] x: A wrinkle occurs.

[0067] ** When the foaming tray of surface milkiness extent C-33 was packed, two steps of milkiness extent on the front face of a film were evaluated.

[0068] O : it is [no surface milkiness] and is good.

[0069] x: A film front face milks.

[0070] (10) The evaluation film of heat-sealing nature was sampled to 1cmx5cm, and in piles, in the Yasuda Energy machine factory JIS heat sealer, the seal was carried out in the pressure of 0.5kg/cm², and 1 second at predetermined temperature, and the temperature (TS) and the film which films weld searched for the temperature (TP) to which ***** opens, and considered two TP-TS as evaluation of heat-sealing nature.

[0071] (11) With the cold-resistant evaluation dirt impact circuit tester, it measured under the 0-degree C condition.

[0072] 2. Use Resin and Elasticity Polyolefine System Resin : PER T310V Tokuyama Make (Content % and MFR of Monomer Based on Amount [of 22.0 % of the Weight] of Crystal Components, TanDelta Peak Temperature [of -19 Degrees C], and Ethylene1.5G/10Min, and Hydrotalcite DHT-4A Product made from Consonance Chemical Industry, 0.2 % of the Weight of Additions) [of 22 Mols]

- Crystalline polypropylene resin : FA520 Tokuyama Make (74 % of the weight of elution volume components 90 degrees C or more and hydrotalcite DHT-4A for which it asked by MFR2.0g/10min, and temperature up temperature elution separation method the product made from the consonance chemical industry, 0.2 % of the weight of additions)

As shown in example 1 table 1, 98 % of the weight (16 % of the weight of contents of the monomer based on Eve FREX V5714:MFR2.0g/10min, and vinyl acetate) of ethylene-vinylacetate

copolymers and the constituent of 2 % of the weight of diglycerol mono-olate were used as resin of a surface layer as resin of a base material layer using the constituent which consists of 10 % of the weight (chestnut ARON P125: Yasuhara Chemical make) of hydrogenation terpene resin PER T310V 80 % of the weight and FA520 10% of the weight. these resin -- a multilayer facing-up tubular blown film making machine -- using -- the extruder of the base material layer resin constituent from the extruder of the 2nd layer, the 1st layer, and the 3rd layer to an ethylene vinyl acetate copolymer constituent -- layer [1st] : 2nd layer: -- the 3rd -- it extruded to the annular dice by the discharge quantity of layer =1:3:1, and the laminating was carried out within the annular dice at 200 degrees C, and it extruded in the shape of a film. Subsequently, Ayr was blown into the interior of a melting cylindrical film, from the exterior, 5-degree C Ayr was sprayed on annular, air-cooling solidification was carried out and the film with a thickness of 13 micrometers was obtained by the blow ratio 7.0. The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0073] As shown in one to examples 2-4 and example of comparison 3 table 1, it carried out like the example 1 except having changed combination of a base material layer resin constituent. The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0074] In example of comparison 4 example 1, it carried out like the example 1 as resin of a surface layer except having considered as the ethylene-vinylacetate copolymer (25 % of the weight of contents of the monomer based on Eve FREX V5701:MFR2.0g/10min, and vinyl acetate). The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0075] In example of comparison 5 example 1, it carried out like the example 1 except having considered as the resin temperature of 175 degrees C, the coolant gas temperature of 35 degrees C, and the blow ratio 1.5. The crystal orientation multiplier of polypropylene was shown in Table 1, and various evaluation results were shown in Table 2.

[0076]

[Table 1]

表1

	基材層樹脂				表面層樹脂	ポリプロピレンの 結晶配向係数
	軟質ポリオレフィン系樹脂	結晶性ポリプロピレン樹脂	石油、テルペン、ロジン樹脂の水素添加誘導体	ハイドロタルサイト類添加剤	エチレン-酢酸ビニル共重合体	
	PER T310V	FA520	クリアロンP125	DHT-4A		
実施例1	80	10	10	0.18	V5714	0.09
実施例2	60	20	20	0.16	V5714	0.11
実施例3	50	20	30	0.14	V5714	0.13
実施例4	40	30	30	0.14	V5714	0.15
比較例1	100	0	0	0.20	V5714	0.09
比較例2	40	50	10	0.18	V5714	0.19
比較例3	30	20	50	0.10	V5714	0.07
比較例4	80	10	10	0.09	V5701	0.09
比較例5	80	10	10	0.18	V5714	0.30

[0077]

[Table 2]

表2

	ヘイズ (%)	成 形 加工性	包装機械適性			仕上がり		ヒートシール性 (°C)	耐寒性 (kg・cm)
			カット性	搬送性	底面折り 込み性	皺	表面 白化		
実施例1	1.2	○	○	○	○	○	○	45	7.5
実施例2	1.1	○	○	○	○	○	○	45	6.3
実施例3	1.3	○	○	○	○	○	○	45	5.8
実施例4	1.3	○	○	○	○	○	○	50	5.5
比較例1	1.4	○	×	○	×	×	○	30	8.2
比較例2	3.8	○	○	○	○	×	○	50	5.0
比較例3	1.2	×	○	○	○	○	○	40	1.5
比較例4	1.6	○	×	×	△	○	○	45	8.0
比較例5	1.4	○	×	○	○	○	×	45	8.1

[Translation done.]